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Rivers, together with a number of lesser streams affords similar evidence for the eastern coast of South America. Africa and Australia appear to have been but little, if any, subjected to recent depressions, while Asia and especially Europe afford clear evidence of extensive subsidence in recent times. On the whole, it would seem that in the disturbances of the relations of land and sea, the tendency is a gradual withdrawal of the coast line towards the center of the continents. (Bull. Geol. Soc. Am., Vol. 6, 1895).

Further evidence in favor of the theory of the igneous origin of the serpentine of the Coast Ranges is found by Prof. Laplache in the study of the Lherzolite-Serpentine rocks of the Potrero, San Francisco. The petrographical character of these rocks show undoubtedly their derivation from an eruptive rock in this area. (Bull. Dept. Geol. Cal. University, 1894).

BOTANY.[1]

A Protest Against the "Rochester Rules."—Quite recently, a protest, signed by seventy-four American botanists, has been distributed, as a contribution to the literature of the nomenclature question. It protests "against the recent attempts made in the United States to change botanical nomenclature on theoretical grounds." This rather vague statement evidently refers to the action of the botanists of the Botanical Club of the American Association for the Advancement of Science taken in Rochester in 1892, and reaffirmed in Madison in 1893. Why the grounds of the action taken at Rochester are considered by the protestants to be theoretical is not made plain; certainly the protestants do not wish to affirm that the men who are prominent in the reform of nomenclature are theorists, nor can they mean that a discussion of nomenclature reform by working botanists is itself theoretical, since a suggestion is made approvingly of an early consideration of the whole subject by a representative international congress.

There is much in the protest with which most botanists will agree, but much of what is said does not apply to the Rochester Rules. Thus the proposition that " one of the most essential features of an efficient botanical nomenclature is a cosmopolitan character," is not to be questioned, and the Rochester movement was intended to be a step toward such a result. So also the first rule proposed by the protestants, viz.: that "ordinal names having long-established usage should not be subjected to revision upon theoretical grounds," is one with which few will disagree, and this again was not referred to in the Rochester Rules. The rule requiring the retention of "long-established and generally known generic names" is a curious one. Starting out with the positive statement that they should be retained, we are next told that "the scope of this rule is left to the discretion of writers"!! How about those whose discretion results in a more rigid scrutiny of such doubtful names? Under the rule, who shall judge between us when we disagree? Moreover, it is urged upon writers that generic nomenclature should not depart far from Benthams and Hooker's Genera Plantarum, Baillon's Histoire des Plantes, and Engler and Prantl's Natürlichen Pflanzenfamilien—"*for the present*"*!* No plank relating to a doubtful question in politics could be more ambiguously drawn so as to provide that flexibility necessary to meet individual preferences. After permitting individual discretion, and allowing some departure (less than the vague distance, "a") from three somewhat different standards, and this only for the present, how much efficiency is left in the rule?

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[1] Edited by Prof. C. E. Bessey, University of Nebraska, Lincoln, Nebraska.

The third rule is scarcely less curious than the second. It is that "in specific nomenclature the first correct combination is to be preferred." Of course. Nobody is asked by the Rochester Rules to prefer any other than the first correct combination. The form of the rule is absurd. The protestants certainly do not wish us to infer that there may be a second "correct combination"—or possibly more. That would be a peculiar priority rule, indeed! But this is not what the protestants wished to say. They probably meant to say that "the correct specific name of a plant is that which it first bears after it has been referred to the proper genus," at least this is what the context suggests. The argument for this rule of priority under the genus, as against the third of the Rochester Rules, can not be said to be well sustained. Many of the earlier references of species to genera from which they had subsequently to be removed, can not, in justice, be regarded as cases of "description under an incorrect genus." Are we simply to ignore the fact as of little importance that Linné described a plant now known as *Steironema ciliatum* ninety years earlier than the date of its transfer from *Lysimachia* to *Steironema?* It is very difficult to see wherein the binomial has any advantage over the specific name in point of stability, or in certainty as to its origin. The instability of specific names is greatly exaggerated by the protestants, and it was to cure the evil so much dreaded by them that Rule III of the Rochester Rules was formulated. At the end of the discussion, however, the whole case is surrendered by the protestants in requiring botanists in the present and future "to preserve scrupulously the specific name without alteration in transferring species from one genus to another."

The fourth rule proposed, which insists upon a sharp line of demarkation between specific and varietal names is not unreasonable to those who hold that species differ radically from varieties. There are still some people who believe in the fixity and original independence of species, and hence of varieties, also, and for whom the facts of development and evolution have no significance. For such, the rule is a logical necessity. The final pronouncement (5) that the principle "once a synonym always a synonym" is recommended as "an excellent working rule for present and future use," is stultified by the addendum to the effect that it "may not be made retroactive." The framers of these rules appear to have a horror of anything which is retroactive, as if for a rule or law to be retroactive were very bad or very dangerous. The word is held up as a sort of bug-a-boo to frighten us. What do they mean by recommending the present use of the rule "once a synonym always a synonym," but forbidding its retroactive use. What is there so sacred in the work of the years preceding the appearance of this protest that it should be spared the application of a principle which the protestants declare to be "an excellent working rule?"

It is necessary to notice but one more of the many curious things in this remarkable document, viz.: the statement that "these rules are designed to apply only to phænogams [sic] and vascular cryptogams." What will the algologists do, and the fungologists, and bryologists? Are they to be allowed to wander around in darkness and disorder, when, by a stroke of the pen, their outlying provinces of the botanical kingdom might have had the benefits claimed by the protestants for their rules. If these rules are good, there is no reason for restricting their application so as to exclude any department of descriptive botany.

CHARLES E. BESSEY.

The Missouri Botanical Garden.—The attention of botanists is called to the facilities afforded for research at the Missouri Botanical Garden at St. Louis. In establishing and endowing the Garden, its founder, Henry Shaw, desired not only to afford the general public pleasure, and information concerning decorative plants and their best use, and to provide for beginners the means of obtaining good training in botany and horticulture, but also to provide facilities for advanced research in botany and cognate sciences. For this purpose, additions are being made constantly to the number of species cultivated in the grounds and plant houses, and to the library and herbarium, and, as rapidly as it can be utilized, it is proposed to secure apparatus for work in vegetable physiology, etc., the policy being to secure a good general equipment in all lines of pure and applied botany, and to make this equipment as complete as possible for any special subject on which original work is undertaken by competent students.

A very large number of species, both native and exotic, and of horticulturists' varieties, are cultivated in the Garden and Arboretum and the adjoining park, and the native flora, easily accessible from St. Louis, is large and varied. The herbarium, which includes nearly 250,000 specimens, is fairly representative of the vegetable life of Europe and the United States, and also contains a great many specimens from less accessible regions. It is especially rich in material illustrative of Cuscuta, Quercus, Coniferae, Vitis, Juncus, Agave, Yucca, Sagittaria, Epilobium, Rumex, Rhamnaceae, and other groups monographed by the late Dr. Engelmann or by attachés of the Garden. The herbarium is supplemented by a large collection of woods, including veneer transparencies and slides for the microscope. The library, containing about 8,000 volumes and 10,000 pamphlets, includes most of the standard periodicals and proceedings of learned bodies, a good collection of morphological and physiological works, nearly 500 carefully selected botanical volumes published before the period of Linnaeus, an unusually large number of monographs of groups of cryptogams and flowering plants, and the entire manuscript notes and sketches representing the painstaking work of Engelmann.

The great variety of living plants represented in the Garden, and the large herbarium, including the collections of Bernhardi and Engelmann, render the Garden facilities exceptionally good for research in systematic botany, in which direction the library also is especially strong. The living collections and library likewise afford unusual opportunity for morphological, anatomical and physiological studies, while the plant house facilities for experimental work are steadily increasing. The E. Lewis Sturtevant Prelinnean library, in connection with the opportunity afforded for the cultivation of vegetables and other useful plants, is favorable also for the study of cultivated plants and the modifications they have undergone.

These facilities are freely placed at the disposal of professors of botany and other persons competent to carry on research work of value in botany or horticulture, subject only to such simple restrictions as are necessary to protect the property of the Garden from injury or loss. Persons who wish to make use of them are invited to correspond with the undersigned, outlining, with as much detail as possible, the work they desire to do at the Garden, and giving timely notice so that provision may be made for the study of special subjects. Those who have not published the results of original work are requested to state their preparation for the investigation they propose to undertake

Under the rules of Washington University, persons entitled to candidacy in that institution for the Master's or Doctor's degree, may elect botanical research work as a principal study for such degrees, if they can devote the requiste time to resident study.

WILLIAM TRELEASE, *Director*.

A New Astragalus.—On June 25, 1892, I started out for a collecting trip from the village of Long Pine, Brown Co., Nebraska. On the outskirts of the village, I came across a patch of *Astragalus lotiflorus*, and mingled with it were plants of similar form and habit, but separated by their extreme hirsuteness. I collected a few of each, knowing that the latter form was new to me, at least; but, not having in my possession all the *Astragali*, even of Nebraska, did not know that it would be new to others. On my next visit, a month later, I found that a flock of sheep had grazed everything to the ground, eating, probably, fruit and all. Many subsequent visits have resulted in determining that the form is very scarce. A few scattered plants have been found along a roadside 100 rods north; none elsewhere, except that a few days' later in the same year, Mr. J. A. Warren found *one plant* in Clay County in southeastern Nebraska. This spring I have been able to find but two plants, the species *lotiflorus* itself being very scarce in the same localities. The new plant is undoubtedly a variety of *A. lotiflorus* Hook., and is described as follows:

Astragalus lotiflorus Hook., var. *nebraskensis.*, n. var. Biennial, or shortlived perennial; the long, very slender tap-root sparsely or not at all fibrous for several inches above; stems 2 to 5 inches long, prostrate-spreading and scarcely ascending, in the larger forms, nearly erect in the smaller, numerous from a crown at or above the surface, stouter than the root; simple; hirsute throughout with white hairs, the half-grown fruit being scarcely visible; leaves 3 inches in length, on furrowed petioles, one inch long; leaflets 7–13, short-petioled, oblong to oblanceolate, very variable, slightly acute to obtuse, less hirsute on the upper surface; stipules ovate, acuminate, scarious-margined, inclined to be scarious with green veins; flowers like *lotiflorus*, very small, yellowish-white to pale lilac, one to three in a raceme almost sessile in the axils of leaves, peduncle lengthening to half an inch in fruit; *not* like *lotiflorus* in equalling the leaves; calyx with lanceolate, acuminate teeth, persistent; legume right-angled from the peduncle, half-ovate or slightly crescent-shaped, acuminate 1 inch long, 4 lines deep, sessile in the calyx, thick chartaceous, one-celled, sometimes cross-wrinkled; seeds in two rows, short-kidney-shaped, numerous.

Specimens have been deposited in the herbaria of the Botanical Survey of Nebraska, University of Minnesota, and Columbia College.

—J. M. Bates.

Long Pine, Neb., May 20, 1895.

VEGETABLE PHYSIOLOGY.[1]

The Action of light on Bacteria.—Under the above title Dr. H. Marshall Ward contributes an interesting article to the *Philosophical Transactions* of the Royal Society of London, Vol. 185 (1894), pp. 961–986. While his experiments have not been confined to the anthrax bacillus, most of those here detailed were made with this organism. The spores were sown in melted agar which was then poured into Petri dishes in the usual way. Portions of these agar films were then exposed to direct sunlight and to the arc light. On the shaded parts of the agar the colonies derived from these spores grew until they completely covered it, while they wholly failed to develop at first, but finally did so in small numbers on the parts exposed to direct sunlight for several hours. After exposure the cultures were placed in an incubator at 20–22° C., only being taken out to examine and photograph. By 3–4 hours exposure to direct bright sunlight and subsequent incubation for a few days, figures and stenciled letters were brought out very distinctly on the surface of the inoculated plates. That this effect is due to insolation has been shown by various writers and is now generally accepted, and that the effect is due to the direct

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[1] This department is edited by Erwin F. Smith, Department of Agriculture, Washington, D. C.